Building a Roadmap for Making Data FAIR in the U.S. Geological Survey
CDI FY19 Full Proposal

Lead PI Information

PI Name: Fran Lightsom
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PI Organization: USGS Woods Hole Coastal and Marine Science Center
PI Mission Area: Natural Hazards
PI City, State: Woods Hole, MA

Plain Language Summary

FAIR is an international set of principles that describe data, and other digital products, that are ready for easy re-use. The acronym stands for Findable, Accessible, Interoperable, Reusable. Using the FAIR principles would improve the value of USGS data, tools, workflows, and systems; creating FAIR data would make USGS integrated science projects easier and quicker. This project will host a workshop of USGS data stakeholders, data professionals, and managers of USGS data systems to define what FAIR means for USGS products and to produce a roadmap for adopting FAIR principles in USGS.

Financial Information

Total Requested Funds: 49724
In-Kind Matching Funds: 94820

Project Information

Project Description: FAIR is an international statement of principles for data that are ready to use in integrated electronic applications to address complex challenges. We propose a cross-Mission Area workshop to build a roadmap for FAIR release of USGS scientific data by engaging many capabilities and disciplines.
List of Anticipated Deliverables: A published roadmap for implementation of FAIR principles in USGS, defined use cases for measuring implementation, and the establishment of a continued community to build on the concepts and conclusions reached in the workshop.
SSF Element 1: Publishing / Sharing
SSF Element 2: Data Management
SSF Element 3: Communities of Practice

Collaborators

	Name	City	State	Organization
Co-PI	Viv Hutchison	Denver	CO	Science Analytics and Synthesis (SAS) Science Data Management Branch
Collaborator	John Faundeen	Sioux Falls	SD	USGS, Earth Resources Observation and Science (EROS) Center
Collaborator	Natalie Latysh	Denver	CO	Core Science Systems, National Geological and Geophysical Data Preservation Program
Collaborator	Linda Debrewer	Reston	VA	Water Mission Area, Office of Quality Assurance
Collaborator	David Govoni	Nokesville	VA	USGS Scientist Emeritus
Collaborator	Wade Bishop	Knoxville	TN	University of Tennessee, School of Information Sciences
Collaborator	Shelley Stall	Washington	DC	American Geophysical Union, Data Programs

Community for Data Integration Full Proposal

Building a Roadmap for Making Data FAIR in the U.S. Geological Survey
Project Narrative

Scope:

We propose a 3-day workshop to bring together an array of data managers, IT professionals, researchers, and others with an interest in overcoming the challenges of data discovery and reuse by applying the Findable, Accessible, Interoperable, Reusable (FAIR) principles to U.S. Geological Survey (USGS) digital assets (systems, tools, workflows, data). The workshop will engage participants in: examining the FAIR principles and their potential application to USGS digital assets; defining current challenges and use cases for finding and reusing USGS data in multi-disciplinary research applications; identifying FAIR-based requirements for digital assets produced by the USGS and other associated interdisciplinary science communities and projects; and drafting a 'blueprint' guide for broader USGS implementation of FAIR principles.

Deliverables resulting from this workshop will include:

1) USGS-series publication summarizing workshop results that includes both an assessment on USGS current status in implementing FAIR principles derived from a pre-workshop community survey, and also a plan for adopting FAIR guidelines for USGS digital assets;
2) presentation to the Community for Data Integration on the workshop outcomes; and
3) established working group to continue the momentum of the Workshop.

In the modern era of scientific research, data are expected to be easily discoverable, accessible, reproducible, and ready for use or reuse. In 2016, the FAIR principles were established by a consortium of stakeholders, including academia, industry, and scholarly publishers, to promote the discovery, evaluation, and reuse of digital resources in downstream studies (Wilkinson et al., 2016). During a similar timeframe, broader government initiatives emerged, supporting a move towards more FAIR data. In 2013, an Executive Order entitled "Making Open and Machine Readable the New Default for Government Information" (President Barack Obama, 2013) and a related policy entitled "Open Data Policy-Managing Information as an Asset" (Office of Management and Budget, 2013) launched a strategy for improving the open accessibility and usability of federal data as a crucial resource. In response, the USGS published a Public Access Plan in 2016 (U.S. Geological Survey, 2016), and has been advancing methods to address these broad federal directives focused on ensuring public access to data used in scientific publications. Broad, global efforts to make scientific data FAIR are also emerging. For example, the "Go FAIR" initiative, based in Europe, promotes implementation networks, technology, training, and resources to achieve a "global internet of FAIR data and services".

While the USGS has made significant strides publicly releasing scientific data used in interpretive scholarly publications, work remains to ensure that digital assets across the Bureau meet FAIR criteria and, thus, assure maximum impact in the USGS and broader scientific research community. Along with encouraging increased data use by individual researchers and the public, FAIR principles promote more effective data-intensive science by facilitating automated machine functions to find and use data. Adoption of FAIR principles by the USGS as a whole will provide time saving and scientific workflow

efficiencies in an overall return on investment by benefiting the following: researchers, in their ability to share and integrate data to advance scientific interpretations; software developers and modelers, who build tools and implement workflows that enhance synthesis of large datasets; federal agencies' ability to make sound, science-based decisions through sharing and integrating data to manage and conserve natural resources; and other partners, scientists, and the public, in their ability to easily find and access scientific information. Implementation of FAIR principles in the USGS contributes to the CDI Science Support Framework by providing foundational practices for scientific data and data management, in pursuit of new scientific discoveries, information, and knowledge.

Application of FAIR principles is not without challenges. The multi-disciplinary diversity and wide-spread distribution of USGS offices, many specifically situated to address regional scientific priorities, reflect the diffusion of USGS research and scientific activities across the Nation. USGS data are stored and disseminated through various online data systems, and multiple trusted digital repositories (TDR) have been established (U.S. Geological Survey, 2018) to enable public access and provide long-term data preservation. The employed data systems and TDRs use differing data models, apply varying metadata standards, and allow a wide range of non-correlating data types. USGS Data Release products meet some FAIR principles by including rich metadata descriptions in standard-compliant formats, hosted in systems that provide robust metadata models to enable consistent discovery, and Application Programming Interfaces (APIs) to enhance automated data discovery and use. While the public accessibility to USGS resources addresses federal mandates, some of which indirectly address elements of FAIR, the full suite of FAIR principles has not been broadly applied. Data and repository owners decide data management techniques to meet the needs of their immediate stakeholders and not necessarily the needs of the larger community of data users. Within the USGS, data users are challenged to integrate native datasets with publicly-distributed USGS data assets.

In its implementation of FAIR, the USGS can capitalize on many significant changes in scientific research and development processes due to rapid advances in computer technology. Data storage and transmission methods, web technology, and software development have already enabled vast dissemination of USGS scientific products, including models, software code and tools, and databases. In the USGS Research Grade Evaluation (RGE) process (U.S. Geological Survey, 2014), USGS scientists are not only evaluated for their contribution to science, but the impact their work makes to science, society, and policy. Scientists are recognized for innovating methods and technology used to derive and produce impactful data used in downstream research. These advances position the USGS to further integrate more challenging aspects of FAIR principles across USGS digital assets to promote discovery and application of novel research methods which increase the impact of the work of USGS scientists and the value of the digital assets they produce. The potential utility of broadly implemented FAIR principles for USGS can have vastly impactful consequences: scientists will be able to substantially reduce the time involved in both finding and integrating existing data into research, thus creating opportunities for more groundbreaking research on timely topics of societal concern.

Technical Approach:

We propose a cross-Mission Area workshop, designed to engage a wide variety of skill sets and knowledge, to outline a roadmap for achieving FAIR for all data released by the USGS. The workshop will focus on key deliverables to identify an actionable path, both technical and best practice oriented, that will guide USGS in implementing new systems to support full data discovery, access, integration, and reuse in groundbreaking scientific research.

We propose to use a workshop format primarily because this technique has proven very successful in the past. Through workshops that involve a variety of Mission Areas and skill sets, the USGS has created community-led outcomes that greatly speed progress in the Bureau. One example is a workshop in 2016, focused on implementation of the USGS Public Access Plan. In March of that year, about 30 individuals gathered for 3 days, resulting in a detailed roadmap used to implement the Plan within 6 months, leading to our current ability to release data compliant with federal open data policies in a timely manner in the Bureau.

To achieve a roadmap for implementation of FAIR principles in USGS, our workshop agenda will be structured to examine the current state of USGS data relative to FAIR, identify critical gaps, and determine the desired state and next steps to achieve FAIR by building on existing technical capacities, workflows, and resources in USGS. Discussions will also focus on evolving technologies and methods for data discovery, delivery, and interoperability for data integration.

Our team will develop a pre-workshop survey to determine current needs of scientists from both a technical and data integration perspective relative to FAIR. This survey will serve as a starting point from which our workshop participants will develop a gap analysis that both validates initial understandings and allows us to identify critical challenges as we plan the steps for implementation of FAIR principles.

The workshop will be arranged topically according to the components of FAIR. A series of 2-3 use cases will be identified and exploited to test our ability to apply FAIR criteria more broadly in the USGS. An example of such a use case is the following:

The USGS Texas Water Science Center is working closely with the United States International Boundary & Water Commission (IBWC) to serve stream discharge and gage height data collected by IBWC and USGS and statistics generated by USGS to the public. The project uses the IBWC's database as the direct source of discharge and gage height data; however, the data are re-entered into the USGS National Water Information System (NWIS) database, where they are pushed to USGS NWISWeb and Water Service. (Currently, the IBWC does not have a public facing data download capability.) This workaround to make the data and statistics findable and accessible poses a challenge, because the process circumvents USGS Water Mission Area (WMA) furnished record and operational data policies which require a Center to take responsibility for data quality and data management when data are stored in NWIS and served to the public from a WMA portal. The Principle Investigator has taken steps to resolve these issues by making the source of the data known to the user and by conducting a daily check on the real-time data for anomalies. Challenges to accessibility and reusability include: the provisional real-time data are available online for 120 days only, and there are no plans for long term maintenance of the data currently used to

make water management decisions on the Rio Grande River. Also, because the data will reside in multiple agency databases, and there is no plan to reconcile changes to the provisional data after initial retrieval from the IBWC, it is difficult to determine which copy is citable or should be used to recreate the dataset over time.

The workshop participants will analyze the use cases based on FAIR principles in order to create prioritized recommendations for each principle.

Overall, the workshop will include both plenary and breakout sessions. The sessions will include:

- Introduction: What is FAIR and why should we care?
    - Emphasize components, relationships and applications in a science data context. Demonstrate mapping explicitly to the USGS Science Data. Lifecycle (SDLC) Model, and the broader DAMA Data Management Model
- State of FAIR at the USGS
    - Through use cases and survey results, identify both accomplishments and gaps in implementing FAIR practices in USGS.
- Getting All the Way to FAIR (Breakout Groups)
    - Build on the previous state of FAIR session to enumerate and prioritize needs and actions
- How Will We Know We are There?
    - Determine our measurements for success.
- A FAIR Roadmap for the USGS (Breakout Groups)
    - Assemble chapters of the roadmap, including technical, organizational, and potential funding recommendations. Successful use-cases are generalized as exemplars/models for broader application within the organization.

The expected deliverables from the workshop will include published proceedings, including a published roadmap for implementation, and defined use cases. In addition to the workshop, we propose to create a FAIR Web page to communicate USGS FAIR resources, such as the FAIR roadmap and training presentations. This resource will be added to an existing website such as the USGS Data Management website. The workshop will also provide the nucleus of an on-going interdisciplinary community to build on the concepts and conclusions reached in the workshop.

In summary, to implement this CDI proposal, the workshop planning team will:

- Design and implement a USGS FAIR needs questionnaire - to be distributed widely and initiated at the CDI in-person workshop in June 2019;
- Summarize results of questionnaire and make them available prior to the workshop;
- Conduct workshop pre-planning: identify and confirm participants, establish logistics for meeting based on cost/location analysis, develop and finalize agenda;
- Hold workshop;
- Summarize workshop outcomes and next steps;
- Finalize roadmap for informational distribution;
- Publish workshop proceedings, including roadmap; establish and promote the USGS FAIR web page; and
- Determine tangible ways in which momentum from the workshop will be sustained and progress tracked in USGS, including support for the on-going community of interest.

Experience and Collaboration:

The workshop organizing team consists of a diverse representation of knowledge, skills, and experience across the Mission Areas of USGS, as well as from the AGU and University of Tennessee. The team includes expertise in Earth science research, data management, computer science and programming, and information behavior. Workshop participants will reflect the same diverse dynamic by including representation from all Mission Areas, and varied skills and knowledge.

Lead PI: Fran Lightsom: Supervisor of Information Science Group, Woods Hole Coastal and Marine Science Center. Currently Principal Investigator (P.I.) of three Coastal and Marine Geology data management projects and Coordinator of the USGS Metadata Reviewers Community of Practice. Past experience in processing, quality control, and management of a collection of USGS oceanographic time series data.

Co-PI: Viv Hutchison: Supervisor of Science Data Management Branch, Science Analytics and Synthesis program in Core Science Systems. Oversees the development and sustainability of multiple enterprise-wide data management applications for the Bureau including ScienceBase, a Trusted Digital Repository, the Digital Object Identifier Tool, the Online Metadata Editor and Metadata Wizard (in partnership with FORT), the Science Data Catalog, and the USGS Data Management Website. Co-coordinator for the CDI Data Management Working Group, participates on the Fundamental Science Practices Advisory Committee (FSPAC) for USGS, and co-leads the FSPAC Data Guidance Subcommittee.

Collaborators:

Cassandra Ladino: IT Applications Manager, Office of Enterprise Information (OEI). Oversees IT application development within OEI. Cassandra also provides knowledge on science support, Data Management, and technology to OEI senior leadership having had experience working in the Eastern Geographic Science Center and a Masters degree in Information Systems. Cassandra is currently a co-coordinator for the CDI Data Management Working Group and Software Development Cluster in addition to participating in DOI and inter-agency working groups on Open Science.

Natalie Latysh: Associate Program Coordinator for the National Geological and Geophysical Data Preservation Program (NGGDPP) and the National Capabilities, which include the NSF - Ice Core Facility and Core Research Center, in Core Science Systems. Performs details as a Bureau Approving Official in Office of Science Quality and Integrity. Coordinates distribution of federal grants to state geological organizations to preserve and expose geoscientific data and collections for research, and in separate role, ensures USGS Fundamental Science Practices are applied to Bureau information products. Previously served as a ScienceBase lead, helping to develop data management methods and digital infrastructure for data archiving and dissemination.

Linda Debrewer: Data Management Coordinator, Office of Quality Assurance, Water Mission Area. Provides oversight on scientific and technical guidance, quality assurance, and policy development to support the needs of WMA programs and field activities. Assists with the development and maintenance of best practices and tools for ensuring the quality of scientific data. Serves as a WMA and OQA Science Records Liaison as well as representative in the CDI Metadata Reviewer Community, CDI Data Management Working Group, and most recently a member of the Fundamental Science Practices Advisory Committee (FSPAC)- Subcommittee on Science Data Guidance.

David Govoni: Physical Scientist Emeritus, Office of Enterprise Information (OEI). David's experience and skills span a range of disciplines including geology, paleobiology, information architecture and website design, web-enabled database design, semantic classification systems, and knowledge management. He has made significant contributions to the progress and products of several CDI working groups, teams, and focus areas, including Data Management, Science Support Framework, Science Data Lifecycle, Data at Risk, Semantic Web, USGS Enterprise Thesaurus, and Citizen Science. In the open data policy arena, David worked in close association with the Office of Science Quality and Integrity (OSQI) and the President's Office of Science and Technology Policy (OSTP) to develop the USGS Public Access Plan. As a Scientist Emeritus volunteer, David continues to contribute to various science data and information discovery, delivery, and preservation projects.

Wade Bishop: PhD and Associate Professor in the School of Information Sciences in the College of Communication and Information of the University of Tennessee. He is an accomplished researcher whose work in geospatial information bridges domains and has served as both Principal Investigator and Co-PI for several federally funded projects. In recent studies, he has assessed the FAIR Data Principles from USGS re-user's perspectives. In addition, he works as a member of the Assessment of Data Fitness for Use Working Group for the Research Data Alliance to measure the FAIR Data Principles. As the Belmont Forum Human Dimensions Champion for e-Infrastructures and Data Management, he has interviewed researchers across countries, institutions, and various funding agencies, to inform data management training and identify gaps in access and use of data.

Shelley Stall: Senior Director, Data Leadership at the American Geophysical Union (AGU), an international society in the Earth, space, and environmental sciences with 60,000 members and 21 scholarly journals. Program manager of an international coalition to enable FAIR data in the Earth, space, and environmental sciences, community supported and funded by Arnold Ventures (previously the Laura and John Arnold Foundation). PI for new Belmont Forum funded project. Collaborator on the Coalition on Publishing Data in the Earth Space and Environmental Sciences (COPDESS), now an ESIP Cluster. Prior to her work at AGU, Shelley worked for more than two decades with high-volume, complex data management environments concerning regulation, interoperability, data governance, metadata management, master data management, and organizational change management. Shelley is one of five certified Enterprise Data Management Experts (EDME) through the CMMI Institute's Data Management Maturity (DMM) program and a Certified Data Management Professional (CDMP) through DAMA International's certification program.

Sustainability/Outreach/Communication:

The outcomes of the proposed workshop can have lasting impacts on the USGS approach to releasing and stewarding our critical scientific data. Successful application of FAIR data principles on USGS data will provide sustainability and data stewardship for years to come through established best practices for repositories, use of identified data formats and standards, and scalable technical capacities.

Following the workshop, we will establish a web presence to illustrate the best practices for FAIR, and how they relate to the roadmap. The availability of a website, particularly one associated with the Data Management Website, which has seen success in making best practices available to USGS researchers, will provide one avenue for extending best practices and thus, increasing knowledge in implementation of FAIR principles.

Further, project leaders and workshop participants will provide momentum in continuing the conversation in CDI, primarily in the Data Management Working Group but also other venues; presentations will be made virtually in future years in forums such as the Water Mission Area Seminars, and the CSS Brown Bag Series. Presentations will also be made to outside organizations such as other agencies and bureaus in the Department of the Interior. The USGS has proven its ability to forward important contributions to the scientific community in data, data management, and data policy, and this will be no exception.

Budget Justification:

This proposal seeks $49,724 to be matched with over $94,000 in-kind contributions from collaborators. The proposed funding will pay travel expenses for 19 workshop participants and CDI attendance for 2 individuals. All labor costs are projected to be in-kind from collaborating Centers and outside organizations. Travel expenses for workshop participants will be allocated as needed, with a request for in-kind contributions from Centers for travel. The location for the workshop will be based on the participant locations and results of a cost analysis for travel; a potential location will be Denver, Colorado, due to its central location, and ability for Denver based participants to incur no costs to the project.

Timeline: Date of Award: about May 31, 2019

Phase 1 (June 1 - June 30): Design and implement USGS Needs Survey - to be distributed widely and initiated at the CDI in-person workshop in June 2019.
Phase 2 (June 30 - July 31): Summarize results of survey and make available to FAIR Workshop participants.
Phase 3 (June 30 - July 31): Conduct Workshop planning: identify and confirm participants; plan logistics for meeting; develop and finalize agenda.
Phase 3 (August 2019): Hold Workshop.
Phase 4: (September 1-30, 2019): Summarize workshop outcomes and next steps, finalize roadmap for informational distribution.
Phase 5: (FY20): Complete formal publication of workshop materials and web-based resources (via in-kind contributions, post award)

References:

GO FAIR International Support and Coordination Office, URL: https://www.go-fair.org/, accessed February 20, 2019.

Office of Management and Budget, 2013, Open Data Policy - Managing Information as an Asset, Memorandum M-13-13 (May 9, 2013), URL: https://obamawhitehouse.archives.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf, accessed February 26, 2019.

President Barack Obama, 2013, Making Open and Machine Readable the New Default for Government Information, Executive Order, URL: https://obamawhitehouse.archives.gov/the-press-office/2013/05/09/executive-order-making-open-and-machine-readable-new-default-government-, accessed February 26, 2019.

U.S. Geological Survey, 2018, Acceptable Digital Repositories for USGS Scientific Publications and Data, URL: https://www2.usgs.gov/fsp/acceptable_repositories_digital_assets.asp, accessed February 21, 2019.

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U.S. Geological Survey, 2014, Research and Equipment Development Grade Evaluation Process Handbook, October 2014, URL: https://www2.usgs.gov/humancapital/hr/rgeg.html, accessed February 12, 2019.

Wilkinson, M. D. et al., 2016, The FAIR Guiding Principles for scientific data management and stewardship. Sci. Data 3:160018, https://doi.org/10.1038/sdata.2016.18.

Appendices

CV of Principal Investigator Lightsom
CV of Principal Investigator Hutchison
CV of collaborator Bishop
CV of collaborator Debrewer
CV of collaborator Govoni
CV of collaborator Ladino
CV of collaborator Latysh
CV of collaborator Stall
Letter of support from American Geophysical Union
Letter of support from DataOne
Letter of support from Earth Science Information Partners
Letter of support from EarthCube
Letter of support from Geological Survey of Alabama

LIGHTSOM, FRANCES
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EDUCATION
Joint Program in Oceanography,
Massachusetts Institute of Technology and Woods Hole Oceanographic Institution
Ph.D. in Physical Oceanography, 1982

CURRENT RESPONSIBILITIES

USGS Coastal & Marine Hazards and Resources Program (CMHRP)
Project Chief (since 2002)

Lead multiple projects that develop and maintain systems used by three science centers to preserve scientific information and make it available online. Recent accomplishments: working with Core Science Systems to develop a data catalog that makes use of controlled vocabularies for facets; implementing procedures to actively manage and update the program's historical collection of metadata.

USGS Woods Hole Coastal & Marine Science Center (WHCMSC)
Supervisor of Information Science Group (since 2002)

Supervise eight-person team that reviews and preserves data and metadata; assists with data release; develops and maintains GIS services, Websites and online data services; ensures records management.

USGS Ocean Data Ambassador

Network with marine planners and marine resource managers to provide USGS data, models, and tools. Network with USGS data specialists to improve responsiveness to marine resource managers' needs. Currently active on implementation group for Coastal and Marine Ecological Classification Standard.

USGS Community for Data Integration (CDI)

Coordinate Metadata Reviewers Community of Practice and Semantic Web Working Group. Co-chair of USGS Fundamental Science Practices Advisory Committee's Subcommittee on Scientific Data Guidance. Co-Principal Investigator of 2018 CDI Project "Content specifications to enable USGS transition to ISO metadata standard." Lead development and ongoing implementation of "The Controlled Vocabulary Manifesto."

RELATED PREVIOUS EXPERIENCE

Interagency Working Group on Ocean and Coastal Mapping (IWG-OCM)
Chair of Project Management Team (2007-2012)

Develop a comprehensive catalog of ocean and coastal mapping projects and data within Geospatial One-Stop. Plan development of a second catalog after retirement of Geospatial One-Stop. Co-author guidance document for metadata standards, including recommended vocabularies.

Marine Realms Information Bank
Project Chief (2002-2011)

Develop and maintain a distributed geolibrary including a gazetteer and multi-faceted controlled vocabulary to organize and providing access to free

online information about the ocean, coasts, and coastal watersheds.

USGS Geology Discipline Research Records Schedule

Writing Team Leader and Trainer (2007-2011)

Lead cooperative project with National Archives and Records Administration to revise USGS Geology Discipline Research Records Schedule and write user's guide. Serve on team to develop training/reference materials and present training to Geology Discipline science centers.

USGS Woods Hole Coastal & Marine Science Center (WHCMSC)

Oceanographic Data Specialist (1990-2002)

Manage processing of oceanographic data acquired by the Sediment Transport Instrumentation Group, including development of new processing software and ensuring quality control and preservation of data.

SELECTED PUBLICATIONS

Montgomery, E.T., Martini, M.A., Lightsom, F.L. and Butman, Bradford, 2016, Documentation of the U.S. Geological Survey Oceanographic Time-Series Measurement Database (version 2.0, April 2016): U.S. Geological Survey Open-File Report 2007–1194, http://dx.doi.org/10.3133/ofr20071194.

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Sullivan, Charlene, Warner, John, Martini, Marinna, Lightsom, Frances, Voulgaris, George, Work, Paul, 2006, Wave Data Processing Toolbox Manual: U.S. Geological Survey Open-File Report 2005-1211. Also available online at http://pubs.usgs.gov/of/2005/1211/.

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Vivian B Hutchison
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Professional Experience

2013-present	Branch Chief, Science Data Management, US Geological Survey, Science Analytics Synthesis
2010-2013	Data Management Coordinator, US Geological Survey, Core Science Analytics Synthesis and Libraries
2002-2010	Metadata Program Coordinator, US Geological Survey, National Biological Information Infrastructure

Education

Pitzer College, Claremont Colleges	Political Science	B.A.	1991
University of Maryland College Park	Information Science	M.L.S.	2002
Virginia Polytechnic Institute and State University	Natural Resources	Certificate	2004

Selected Honors and Awards

- Meritorious Service Honor Award (2018)
- Unit Award for Excellence of Service, Department of the Interior, Public Access Leadership Team (2018)
- STAR Award (2018) for Outstanding Leadership as the USGS Acting Library Director
- Group STAR Award (2018) for leadership in completion and presentation of the USGS Library Subscriptions Analysis
- Certificate of Appreciation (2018) for contributions to support the Federal Lands Recreation Pass program
- STAR Award (2016) for contributions to Bureau-wide tools supporting Public Access
- USGS Shoemaker Communications Award (2013)
- USGS 101 and 201 Leadership Training (2011, 2012)
- Various STAR Awards, USGS (2004-2014)
- Beta Phi Mu, Honor Society for Library and Information Science (Induction: February, 2003)

Selected Committees and Working Groups

- Co-lead, National Science Foundation DataONE Community Education and Outreach (2009-present)
- Participant, National Science Foundation DataONE Leadership Team (2009-present)
- Co-lead, USGS Community for Data Integration Data Management Working Group (2010-present)
- Co-lead, USGS Scientific Data Guidance Subcommittee – Fundamental Science Practices Advisory Committee (2012-present)
- Co-lead, USGS Data Release Working Group (2012-present)
- USGS Representative, Earth Science Information Partners (ESIP) Federation (2012-present)
- Participant, USGS Fundamental Sciences Practices Advisory Committee Data Preservation Sub-Committee (2013-present)
- President, Organization of Fish and Wildlife Information Managers (2006-2007)
- Lead, USGS Digital Object Identifiers Working Group (2013)
- Organizing Committee, GeoData Conference (2014)
- Participant, Data Services Team, Department of the Interior (2015-present)
- Panelist, Science Data Archive Review Team, Department of Energy (March 2017)
- Participant, Earth Science Information Partners (ESIP) Partnership Committee (2017)
- Co-Lead, US Group on Earth Observations Subcommittee of the National Science and Technology Council (2017-present)
- Reviewer, Elsevier Ecological Informatics (August 2017)
- Participant, USGS Fundamental Science Practices Advisory Committee (2018-present)
- Participant, Earth Science Information Partners (ESIP) Nomination Committee (2018)

Selected Publications

Faundeen, John L., and Vivian B. Hutchison. 2017. "The Evolution, Approval and Implementation of the U.S. Geological Survey Science Data Lifecycle Model." *Journal of eScience Librarianship* 6(2): e1117. https://doi.org/10.7191/jeslib.2017.1117

Soyka, Heather, Amber Budden, Viv Hutchison, David Bloom, Jonah Duckles, Amy Hodge, Matthew S. Mayernik, Timothée Poisot, Shannon Rauch, Gail Steinhart, Leah Wasser, Amanda L. Whitmire, and Stephanie Wright. 2017. "Using Peer Review to Support Development of Community Resources for Research Data Management." *Journal of eScience Librarianship* 6(2): e1114. https://doi.org/10.7191/jeslib.2017.1114

Hou, Chung-Yi; Soyka, Heather; Hutchison, Vivian; Sema, Isis; Allen, Chris; Budden, Amber. 2017. Evaluating the Effectiveness of Data Management Training: DataONE's Survey Instrument - International Journal of Digital Curation; https://doi.org/10.2218/ijdc.v12i2.508

Duda, J.J., Wieferich, D.J., Bristol, R.S., Bellmore, J.R., Hutchison, V.B., Vittum, K.M., Craig, Laura, and Warrick, J.A., 2016, Dam Removal Information Portal (DRIP)—A map-based resource linking scientific studies and associated geospatial information about dam removals: U.S. Geological Survey Open-File Report 2016-1132, 14 p., http://dx.doi.org/10.3133/ofr20161132

Faundeen, John, Burley, Thomas, Carlino, Jennifer, Govoni, David, Henkel, Heather, Holl, Sally, Hutchison, Vivian, Martin, Elizabeth, Montgomery, Ellyn, Ladino, Cassandra, Tessler, Steve, Zolly, Lisa. 2013. The United States Geological Survey Science Data Life Cycle Model: U.S. Geological Survey Open-File Report 2013–1265, 4 p., http://pubs.er.usgs.gov/publication/ofr20131265

Vivian Hutchison, Thomas Burley, Michelle Chang, Thomas Chatfield, Robert Cook, Heather Henkel, Carly Strasser, Lisa Zolly. 2013. USGS Data Management Training Modules. USGS Community for Data Integration. http://dx.doi.org/10.5066/F7RJ4GGJ

Hutchison, Vivian. "Spatial Data Management through Metadata: Global Concepts, Formats, Tools and Requirements." Spatial Complexity, Informatics, and Wildlife Conservation. Ed. Samuel A. Cushman and Falk Huettman. New York: Springer, 2009. 223-232.

San Gil, I; Hutchison, V; Palanisamy, G; Frame, M. "Metadata Activities in Biology", Metadata for Scientific Data, Journal of Library Metadata; vol 10, issue 2: 99-118.

Professional Presentations (Select)

- *A Roadmap for Enabling Integrated Science: the USGS Experience in Open Data* Hutchison, V. AUTM Conference: February, 2019
- *Working Towards Integrated Science: Policies, FAQs and Tools for Science Data Management* Hutchison, V., Kirk, K., National Park Service: February, 2019
- *A Roadmap for Enabling Integrated Science: The USGS Experience in Open Data* (Keynote Address) Hutchison, V., Twentieth International Conference on Grey Literature: December, 2018
- *Managing Science Data in USGS - Tools, Best Practices, and Challenges* Hutchison, V., Data Storage Architecture Workshop: April, 2018
- *Towards Open, Public Access: the Evolving USGS Experience* Hutchison, V. University of Florida: March, 2018
- *DataONE Assessments for Online Learning Materials* Hutchison, V., Earth Science Information Partners: January, 2018
- *USGS Approaches to Science Data Management* Hutchison, V., Natural Resources Canada November, 2017
- *USGS Approaches to Science Data Management* Hutchison, V., United States Environmental Protection Agency: October, 2017
- *Managing Science Data through Tools, Best Practices, Community Engagement* Hutchison, V., Organization of Fish and Wildlife Information Managers: October, 2017
- *USGS: Managing Science Data through Tools, Best Practices, and Community Engagement* Hutchison, V. USGS Core Science Systems: August, 2017
- *A Roadmap for Enabling Integrated Science: USGS has Experience with This!* Hutchison, V. Community for Data Integration: May, 2017
- *USGS implementation of Open Data* Hutchison, V. United States Department of the Interior Data Services Forum: March, 2017
- *Moving Beyond Mandates: Progress Toward Public Access and What the Future Holds Hutchison, V.* Earth Science Information Partners: January, 2017
- *Science Data Management Workshop* (1/2 day) Hutchison, V. Alaska Marine Science Symposium: January, 2017
- *USGS Approaches to Science Data Management* (Keynote Address) Hutchison, V. United States Fish and Wildlife Service: November, 2016
- *Public Access/Open Data Progress and Challenges* Hutchison, V., Ecosystems Monitoring Visioning Workshop: October, 2016
- *USGS Public Access Plan Requirements* Hutchison, V. USGS Deputy Associate Directors June, 2016
- *Science Data Management in USGS* Hutchison, V. Office of Enterprise Information: June, 2016
- *Science Data Management* Hutchison, V. Office of Management and Budget: May, 2016

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EDUCATION

Ph.D. Florida State University. Library and Information Studies, 2010.
M.A. University of South Florida. Library and Information Science, 2006.
B.S. University of Florida. Major: Marketing, Minor: English, 2003.

AREAS OF INTEREST

Geographic Information Systems and Science, Data Discovery, Fitness for Use, Virtual Reference, Information Policy, Public Libraries, Library & Information Sciences Education

EXPERIENCE

University of Tennessee, Knoxville

Associate Professor, School of Information Sciences, Aug 2017—present.
Adjunct Faculty, Department of Geography
Research Integrity Officer, Office of Research & Engagement, Oct 2017—Apr 2018.
Assistant Professor, School of Information Sciences, Aug 1, 2013—Jul 2017.

Belmont Forum

Human Dimensions e-Infrastructures and Data Management Champion. Aug 2018—Feb 19.

University of Kentucky, Lexington

Assistant Professor, School of Library and Information Science, Aug 2010—June 2013.

Florida State University, Tallahassee

Graduate Research Associate, Information Use Management and Policy Institute, May 2007—July 2010.
Instructor, College of Communication and Information, Aug 2009 – Dec 2009.
Teaching Assistant, **College of Communication and Information**, Jan 2007—May 2010.

HONORS

Best Paper. International Data Curation Conference (IDCC). 2018.
The Gloria and Dave Sharrar Faculty Research Fund. 2017.
College of Communication and Information. Faculty Research Award. 2016.
Best Overall Conference Paper. Conference of the Canadian Association for Information Science (CAIS). 2016.
Bonnie Carroll and Roy Cooper Faculty Enrichment Award. 2015 & 2018.
2013-14 SEC Faculty Travel Grant Program. 2014.
Florida State University SLIS Outstanding Doctoral Student Award. 2010.
Florida State University SLIS. Inducted Beta Phi Mu, Gamma Chapter, 2010.
Florida State University CCI Doctoral Poster Competition 1st place. 2009.
Eugene Garfield Doctoral Dissertation Fellowship Award. 2009.
Florida State University School of Library and Information Foundation Scholarship. 2008.
Florida State University School of Library and Information Studies Lewis-Marxsen Scholarship. 2007.

RECENT PUBLICATIONS

Bishop, B. W., & Hank, C. (2020). Curation, Digital. In Audrey Kobayashi (Ed.), *International Encyclopedia of Human Geography, 2e.* Amsterdam, Netherlands: Elsevier.

Hank, C. F. & **Bishop, B. W.** (forthcoming). Considerations for information professional education in data management: Lessons learned from biota and earth science. *Journal of Education for Library and Information Science.*

Bishop, B. W. & Hank, C. F. (2019). The Data Life Aquatic: Oceanographers' Experience with Interoperability and Re-usability. International Digital Curation Conference, February 2019, Melbourne, AU.

Bishop, B. W. & Hank, C. F. (2018). Earth Science Data Management: Mapping Actual Tasks to Conceptual Actions in the Curation Lifecycle Model. In: Chowdhury G., McLeod J., Gillet V., Willett P. (Eds.). *Transforming Digital Worlds. iConference 2018. Lecture Notes in Computer Science*, Vol. 10766. Springer, Cham. https://doi.org/10.1007/978-3-319-78105-1_67

Bishop, B. W. & Hank, C. F. (2018). Measuring FAIR Principles to Inform Fitness for Use. International Digital Curation Conference, February 2018, Barcelona, ES. [Best Paper]

Bishop, B. W. & Hank, C. F. (2018). Measuring FAIR principles to inform fitness for use. *International Journal of Digital Curation, 13*(1).

Mehra, B., **Bishop, B. W.**, and Partee II, R. P. (2018). A case methodology of action research to promote economic development: Implications for LIS education. *Journal of Education for Library and Information Science, 59*(1/2), 48-65.

Mehra, B., **Bishop, B. W.**, and Partee II, R. P. (2017). How do public libraries assist small businesses in rural communities? An exploratory qualitative study in Tennessee. *Libri: The International Journal of Libraries and Information Studies, 67*(4), 245-260.

Mehra, B., **Bishop, B. W.**, & Partee, R. (2017). Small business perspectives about the role of rural libraries in economic development. *Library Quarterly, 87*(1), 17-35.

Mehra, B., **Bishop, B. W.**, & Partee II, R. P. (2017). A gap analysis of the perspectives of small businesses and rural librarians in Tennessee: Guidelines to develop a blueprint of a small business public library toolkit. In Brian Real (Ed.), *Rural and Small Public Libraries: Challenges and Opportunities* (Advances in Librarianship Series). Bingley, UK: Emerald Group Publishing.

Hank, C. F. **& Bishop, B. W.** (2017). Data Curation Readiness for Biocollections. International Data Curation Conference, February 2017, Edinburgh, UK.

Law, E., White, C., Beaulieu, S., **Bishop, B. W.,** Bowring, J., Bristol, S., Jones, D., Hsu, L., Scott, S., Duerr, R., Robinson, E., Caron, B, (2017). Earth Science Information Partners, Vision for the Future of Cyberinfrastructure. https://doi.org/10.6084/m9.figshare.4831627.v1

Bishop, B. W. & Hank, C. F. (2016). Data Curation Profiling of Biocollections. American Society for Information Science and Technology Annual Meeting, October 2016, Copenhagen, Denmark.

Mehra, B., **Bishop, B. W.**, & Partee, R. (2016). Information Science Professionals as Community Action Researchers to Further the Role of Rural Public Libraries in Small Business Economic Development: A Case Study of Tennessee. Canadian Association for Information Science, June 2016, Calgary, AB. [Best Overall Paper]

Bishop, B. W., & Grubesic, T. H. (2016). *Geographic Information: Organization, Access, and Use*. New York: Springer.

Bishop, B. W. & Hank, C. F. (2016). Data curation profiling of biocollections. *Proceedings of the Association for Information Science and Technology, 53*(1), 1-9. doi: 10.1002/pra2.2016.14505301046

Mehra, B., **Bishop, B. W.**, and Partee II, R. P. (2016). Information science professionals as community action researchers to further the role of rural public libraries in small business economic development: A case study of Tennessee. *Canadian Journal of Information and Library Science, 40*(4), 289-299.

Bishop, B. W., Mehra, B., & Partee, R. (2016). The role of rural public libraries in small business development. *Public Library Quarterly, 35*(1), 1-14.

Bishop, B. W., Haggerty, K. C., & Richardson, B. E. (2015). Usability of E-government mapping applications: Lessons learned from the U.S. National Atlas. *International Journal of Cartography, 1*(2)*, 272-282.* http://dx.doi.org/10.1080/23729333.2015.1093333

Wei, F., Grubesic, T. H., & **Bishop, B. W.** (2015). Exploring the GIS knowledge domain using CiteSpace. *The Professional Geographer, 67*(2), 374-384. doi:10.1080/00330124.2014.983588

Bishop, B. W., Moulaison, H. L. & Burwell, C. L. (2015). Geographic knowledge organization: Critical cataloging and place-names in the Geoweb. *Knowledge Organization, 42*(4), 199-210.

LINDA MARIE DEBREWER
U.S. Geological Survey
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703-648-5011 lmdebrew@usgs.gov

EDUCATION

Indiana University, Bloomington, Indiana
School of Public and Environmental Affairs
Master of Public Affairs, 1996
Master of Science in Environmental Science, 1996
Concentration: Hydrogeology

Bryn Mawr College, Bryn Mawr, Pennsylvania
Bachelor of Arts, 1991
Major: Geology

RECENT EXPERIENCE

U.S. Geological Survey, Office of Quality Assurance
Reston, Virginia October 2018-present

Data Management Support

- Coordinate, develop, and maintain guidance, best practices, and tools for ensuring the quality of Water Mission Area (WMA) scientific data.
- Ensure the WMA has processes for improving and monitoring data quality and optimizing workflows for the entire data life cycle, from planning to final release.

Policy Coordination and Oversight

- Coordinate development and maintenance of technical policy within the WMA and ensure hydrographers have access to and awareness of latest technical policies.
- Assist with developing, monitoring development, and distribution of technical policy and guidance.

Technical Review Support

- Conduct technical reviews of scientific work done within Science Centers as well as the Divisions/Branches, Offices and Programs of the WMA to ensure staff follow quality assurance practices, comply with policies, and have data-management practices in place.

U.S. Geological Survey, Office of Groundwater
Reston, Virginia October 2009-September 2018

Groundwater Data Coordinator and Field Technical Support

- Evaluate the need for and conduct data, records management, and field techniques training.
- Provide advice and support on groundwater data issues to Science Centers and report to senior management.
- Serve as Technical Office Lead on user groups to maintain close contact with software developers and ensure database enhancements satisfy the needs of the users.

Policy Coordination and Oversight

- Develop data policy, guidance, and conduct training to ensure Science Centers understand and comply with established policy and procedures.

Technical Review Support

- Develop and maintain tools and scripts used to evaluate the technical health of Science Center program.
- Conduct technical reviews of Water Center program, field techniques, and data management practices.
- Recruit and train field and data reviewers and maintain resources for reviewers.

U.S. Geological Survey, Maryland- Delaware-DC Water Science Center

Baltimore, Maryland December 2000-October 2009

National Program Management *- Assistant to Groundwater Status and Trends Coordinator, NWQA Program*

- Compile, review, and oversee implementation of long-term strategic and operational plans and data management for 42 study units across the nation.
- Provide technical oversight and track status of field operations.
- Participate on program National Data Synthesis Team and contributed to National Water Information System database development and enhancement.

Hydrologic Investigations

Project Manager, Groundwater Discharge to the Dalecarlia Reservoir, Washington, D.C.

- Participate in strategic planning meetings for project development with US Army Corps of Engineers cooperator.
- Plan and conduct hydrologic investigation of groundwater discharge to major drinking water supplier for Washington, D.C. and Northern Virginia.
- Supervise or conduct installation and survey of well points as well as stream discharge, water level, and water-quality measurements.
- Conduct technical review of work plans, quality assurance plans, and flux model for cooperator.

Groundwater Specialist for Potomac River Basin and Delmarva Peninsula NAWQA

- Design several regional groundwater data collection networks using sound conceptualization of hydrologic systems.
- Perform data and database management activities.
- Plan and coordinate field activities for site selection and sampling multiple groundwater and surface water networks.
- Respond to data requests from within the USGS, cooperators, and the public.
- Collaborate with project staff in budgeting, data collection, scientific data interpretation and presentation.
- Ensure all aspects of project involving data collection are archived according Bureau and program guidelines.
- Analyze and interpret water quality and other data to understand significant factors and processes controlling spatial and temporal trends.
- Represent the USGS and the study unit at technical society meetings and seminars.

BIBLIOGRAPHY

Debrewer, L.M., S.W. Ator, and J.M. Denver, 2008, Temporal Trends in Nitrate and Selected Pesticides in Mid-Atlantic Ground Water: Journal of Environmental Quality 37(5):S296-S308, doi: 10.2134/jeq2007.0664.

Debrewer, L.M., Ator, S.W., and Denver, J.M., 2007, Factors Affecting Spatial and Temporal Variability in Nutrient and Pesticide Concentrations in the Surficial Aquifer on the Delmarva Peninsula: U.S. Geological Survey Scientific Investigations Report 2005-5257, 45 p., doi: 10.3133/sir200552

Klohe, C.A. and Debrewer, L. M, 2006, Summary of Ground-Water-Quality Data in the Anacostia River Watershed, Washington, D.C., September - December 2005: U.S. Geological Survey Open-File Report 2006-1392, 65 p., doi: 10.3133/ofr20061392

Denver, J.M., Ator, S.W., Debrewer, L.M., Ferrari, M.J., Barbaro, J.R., Hancock, T.C., Brayton, M.J., and Nardi, M.R., 2004, Water quality in the Delmarva Peninsula, Delaware, Maryland, and Virginia, 1999-2001: U.S. Geological Survey Circular 1228, 36 p., doi: 10.3133/cir1228

Debrewer, L.M., Rowe, G.L., Reutter, D.C., Moore, R.C., Hambrook, J.A., and Baker, N.T., 2000, Environmental setting and effects on water quality in the Great and Little Miami River Basins, Ohio and Indiana: U.S. Geological Survey Water-Resources Investigations Report 99-4201, 98 p., doi: 10.3133/wri994201

Debrewer, Linda and David Hokanson, 1996, Adopting Integrated Pest Management in the Monroe County Community School Corporation – Case study and analysis: Indiana University School of Public and Environmental Affairs.

Debrewer, Linda, Hokanson, David, and Longhouse, Andrea, 1995, Pest management analysis and policy recommendations – A report to the Monroe County Community School Corporation: Indiana University School of Public and Environmental Affairs.

DAVID L. GOVONI
Physical Scientist Emeritus
Office of Enterprise Information (OEI)
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david.govoni@gmail.com — 703-791-5603 (h)
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BIOGRAPHY

I joined the U.S. Geological Survey (USGS) in 1990 following several years teaching geology, undertaking paleontological research at the Smithsonian Institution, engaging in IT management and pursuing IT and academic consulting in the private sector, and conducting economic analyses for the U.S. Department of Energy.

During my tenure at the USGS, I initially served in a variety of capacities designing and managing websites and web-enabled database applications, including the USGS Geographic Names information System. I engaged in various activities and special projects relating to the general topics of information architecture, information discovery and delivery, and general knowledge management. These included strategic planning, policy development, website and application design and usability evaluation, database design, systems modeling, and technology assessment. As one of the founders and original coordinators of the USGS Community for Data Integration (CDI), I took on active and significant roles in the planning, coordination, and execution activities of several working groups, teams, and focus areas, including Data Management, Science Support Framework, Science Data Lifecycle, Data at Risk, Semantic Web, USGS Enterprise Thesaurus, and the Citizen Science Working Group (which I co-founded).

Under the auspices of the OEI until my retirement in 2017, I participated in a number of internal USGS and inter-agency projects in support of various aspects of federally-mandated USGS open data access policy development and implementation, as well as public participation in science (or 'citizen science'). Chief among the open data projects was co-development, in collaboration with the USGS Office of Science Quality and Integrity (OSQI), of the USGS "Public Access to Results of Federally Funded Research" Plan, as required by the President's Office of Science and Technology Policy (OSTP). My work with internal USGS and external Federal citizen science interest groups and the OSTP culminated in the establishment of an all-Federal citizen science community of practice and the design and development of the data management and other sections of the online "Federal Crowdsourcing and Citizen Science Toolkit".

As a Scientist Emeritus volunteer, I continue to contribute to various science data and information discovery, delivery, and preservation projects and initiatives.

PREVIOUS CDI-FUNDED PROJECTS

- FY 2016: Developing a USGS Legacy Data Inventory to Preserve and Release Historical USGS Data
- FY 2012: Citizen Science Observation Platform - Using Curated Twitter and GeoRSS Enabled Feeds
- FY 2012: Semantic Technologies for Integrating USGS Data
- FY 2012: USGS Citizen Science Workshop (Co-PI)
- FY 2012: USGS Mobile Applications Development Support Framework

EDUCATION

- **B.A. (Honors)**, 1971, Rutgers University (Geology)
- Graduate Studies, State University of New York at Stony Brook (Paleobiology)
- **M.S.**, 1983, The George Washington University (Paleobiology, Biostratigraphy)

EMPLOYMENT

- **Physical Scientist** — USGS, Office of Enterprise Information, Reston, VA — 2002 to 2017
- **Web Services Coordinator** — USGS, National Mapping Division, Reston, VA — 1990 to 2002
- **Director of Management Information Systems** — Soil Consultants, Inc., Fairfax, VA — 1988 to 1990
- **Science Publications Editor / IT Consultant** — Self-employed, Nokesville, VA — 1987 to 1990
- **Associate Resource Economist** — McGraw-Hill/Data Resources, Inc., Washington, DC — 1983 to 1987
- **Lecturer in Geology** — Various Colleges and Universities, Virginia, Maryland, District of Columbia — 1973 to 1987
- **Senior Staff Geologist** — U.S. Department of Energy, Economic Regulatory Administration, Washington, DC — 1980 to 1981
- **Assistant Professor of Geology** — George Mason University, Fairfax, VA — 1979 to 1980
- **Graduate Research Assistant** — Smithsonian National Museum of Natural History, Washington, DC — 1974 to 1976
- **Student Research Assistant** — Academy of Natural Sciences, Philadelphia, PA — 1964 to 1971

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Geophysical Union
- Paleontological Society

SELECTED PUBLICATIONS

Faundeen, J.L., Burley, T.E., Carlino, J.A., **Govoni, D.L.**, Henkel, H.S., Holl, S.L., Hutchison, V.B., Martín, Elizabeth, Montgomery, E.T., Ladino, C.C., Tessler, Steven, and Zolly, L.S., 2013, The United States Geological Survey Science Data Lifecycle Model: U.S. Geological Survey Open-File Report 2013–1265, 4 p., http://dx.doi.org/10.3133/ofr20131265.

Gibson, T.G., Bybell, L.M., and **Govoni, D.L.**, 1991, Paleocene and Eocene strata of the central Atlantic Coastal Plain, in Paleocene-Eocene boundary sedimentation in the Potomac River valley, Virginia and Maryland. (T.G. Gibson, leader and others). International Geoscience Programme (IGCP) Project 308, October 31, 1991, p. 1-13.

Gordon, Janice, Chkhenkeli, Nina, **Govoni, David,** Lightsom, Frances, Ostroff, Andrea, Schweitzer, Peter, Thongsavanh, Phethala, Varanka, Dalia, and Zednik, Stephan, 2015, A case study of data integration for aquatic resources using semantic web technologies: U.S. Geological Survey Open-File Report 2015–1004, 55 p., http://dx.doi.usgs/10.3133/ofr20151004.

Hines, M., Benson, A., **Govoni, D.**, Masaki, D., Poore, B., Simpson, A., and Tessler, S., 2013, Partnering for Science; Proceedings of the USGS Workshop on Citizen Science: U.S. Geological Survey Open--File Report 2013–1234, 51 p., http://pubs.usgs.gov/of/2013/1234/.

Govoni, D.L., 1983, Gastropod molluscs from the Brightseat Formation (Paleocene: Danian) of Maryland. Unpublished MS Thesis, George Washington University, Washington, D.C., p. 1-270, 15 pls.

Govoni, D.L., 1991, Composition and biogeographic significance of the gastropod mollusk fauna of the Brightseat Formation (Paleocene: Danian) of Maryland, in Paleocene-Eocene boundary sedimentation in the Potomac River valley, Virginia and Maryland. (T.G. Gibson, leader and others). IGCP Project 308, October 31, 1991, p. 63-83.

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IT specialist, 10+ years of professional government experience in project management and application design. Dual focus on Cloud computing and Data Management. Earned Master of Science in Information Systems with focus on project life cycle development, core web programming languages and databases.

Education:

M.S. - University of Maryland Baltimore County (2013), Information Systems
M.P.S. - University of Maryland Baltimore County (2010), Geographic Information Systems
B.S. - University of Maryland Baltimore County (2006), Geography and Environmental Science

Professional Experience:

IT Applications Manager, USGS Office of Enterprise Information, October 2017 – Present

Skills

- Develop a breadth of knowledge about current and future directions of Information Management at USGS and DOI.
- Acquire experience in requirements development, design, and project management of large IT systems. Lead manager, Laboratory Web Portal for the USGS Strategic Lab Committee (SLC).

Duties

- Provide Data Management expertise in OEI coordination meetings and outreach events
- Participate in Open Data/ Open Access activities
- USGS representative at Interagency Working Group on Open Science Committee on Science
- USGS representative on DOI OCIO Managing Data as a Strategic Asset working group
- USGS secondary contact for Data.gov
- USGS Strategic Labs Committee and Quality Management System Working Group
- Project coordinator for the USGS Configuration Management Committee
- Co-lead USGS CDI Data Management Working Group

Physical Scientist, USGS Eastern Geographic Science Center, 2014 - 2017

Skills

- Developed requirements and specifications for several web based applications (listed below) to meet scientific objectives of the USGS Chesapeake Bay Studies. This included working directly with scientists as customers and evaluating available resources to select the most cost effective and timely solutions to meet requirements. A specialty was implementing open source solutions in the cloud and drawing from industry standard best practices.
- Conducted review, testing, and approval of applications as the applications project manager.
- Managed documentation and standard operating procedures written to support development or operation of applications.
- Monitored application life cycles, including application reviews, changes in response to customer needs, and evaluation of continued application support.
- Created effective teams by encouraging mentoring, training, and communication and implementing RAD and AGILE development methodologies.
- Maintained operations without significant project delays or increased cost through employee transitions that had a major impact on the team's development approach.
- Networked with several other application development teams in the USGS, including creating partnerships to transition work from EGSC staff.
- Created and implemented data management procedures for data release at EGSC.
- Developed a breadth of knowledge about diverse scientific research across the USGS.

Duties

- USGS Chesapeake Bay Studies Science Team Lead on Managing and Providing Information.
- Data management and integration with the Endocrine Disrupting Chemicals Project
- USGS Eastern Geographic Science Center, Data Manager
- EGSC Web Applications Project Manager
    - USGS Disease Maps Website
    - USGS Sediment-bound Contaminant Resiliency and Response Strategy (SCoRR)
    - Chesapeake Bay Phase 6 Land Cover Application
    - Chesapeake Bay Nontidal Monitoring website

USGS Eastern Geographic Science Center, 2011 - 2014

Skills

- Developed leadership skills working with the Chesapeake Bay Studies Science Team Leads and taking on project management tasks at EGSC.
- Gathered use case requirements and gave input to design of web applications.
- Wrote and implemented JavaScript code to support development of large web application and took the lead on developing smaller applications. This included learning best practices from industry, working with code repositories for quality control, introduction to procedure and code documentation, and testing prototypes.
- Networked within the USGS CDI to learn about new best practices for Data Management.

Duties

- USGS Chesapeake Bay Studies Science Team Lead on Managing and Providing Information.
- EGSC Data Management support and guidance
- EGSC web applications developer
- USGS Disease Maps Website, Project Manager

Eastern Geographic Science Center, 2006 - 2011

Skills

- Developed team collaboration skills.
- Focused on use case requirement gathering from science experts.
- Wrote and implemented JavaScript code to support development of large web application and took the lead on developing smaller applications. This included learning best practices from industry, working with code repositories for quality control, introduction to procedure and code documentation, and testing prototypes.

Duties

- United States Geological Survey / United States Environmental Protection Agency Chesapeake Bay Program, Chesapeake Online Adaptive Support Tools (COAST)
- Team lead on design of COAST online decision support tools and website framework.
- EGSC web application developer

Honors:

USGS CDI Leadership and Innovative Excellence Award, 2017
USGS Superior Service Honor Award, October 2013

Selected Publications:

Ladino, C.C., 2013, Defining a data management strategy for USGS Chesapeake Bay studies: U.S. Geological Survey Open-File Report 2012–1005, 7 p., http://pubs.usgs.gov/of/2013/1005/.

Faundeen, J.L., Burley, T.E., Carlino, J.A., Govoni, D.L., Henkel, H.S., Holl, S.L., Hutchison, V.B., Martín, Elizabeth, Montgomery, E.T., Ladino, C.C., Tessler, Steven, and Zolly, L.S., 2013, The United States Geological Survey Science Data Lifecycle Model: U.S. Geological Survey Open-File Report 2013–1265, 4 p., http://dx.doi.org/10.3133/ofr20131265.

Natalie Latysh
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PROFESSIONAL EXPERIENCE

U.S. Department of the Interior, U.S. Geological Survey
National Geological and Geophysical Data Preservation Program and National Capabilities
February 2015 – Present
Associate Program Coordinator / Physical Scientist

- Manage National Geological and Geophysical Data Preservation Program (NGGDPP) by establishing Program priorities, working with state geological surveys and USGS representatives on data preservation-related issues, engaging in outreach activities, and coordinating grant requirements.
- Participate in strategic program planning, review, analysis, coordination, and monitoring of USGS activities related to information science, geoinformatics, records management, scientific collections and data management, and preservation of scientific data and materials. Facilitate problem solving and decision-making processes involving funding allocation and Program priorities; and follow up with management, partners, and stakeholders to support implementation of Program decisions. Review ongoing Program elements to assure goals are being met.
- Address data calls and develop Program descriptions and status reports for use by Congress, Office of Management and Budget, General Accounting Office, and USGS and Department of the Interior management.
- Collaborate with USGS and partner technologists to improve data, metadata, and information dissemination for NGGDPP state and USGS participants.

U.S. Department of the Interior, U.S. Geological Survey
Core Science Analytics, Synthesis, and Libraries
August 2008 – February 2015
Physical Scientist

- Served as lead for ScienceBase Data Management Infrastructure Project. Collaborated with scientists from federal, state, and other partner organizations to integrate multidisciplinary data resources to generate robust, enduring information-dissemination methodologies and develop technological infrastructure to accommodate data management needs for broad multi-faceted projects, often focusing on applying scientific findings to land and resource management.
- Initiated, developed, and organized web space architecture for assimilated project data and information.

- Applied geographic information science, semantic data integration, and other scientific data manipulation techniques to derive data sets with value-added attribution from new and existing sources of biological and earth sciences data.
- Coordinated sharing of data collected for monitoring and other scientific studies among partners, including land-management agencies, state and local grassroots organizations, and the public.

U.S. Department of the Interior, U.S. Geological Survey, Water Resources Division
March 2000 – August 2008
Hydrologist

- Administered quality assurance programs for the National Atmospheric Deposition Program (NADP) and managed Sediment Laboratory Quality Assurance (SLQA) Project for USGS and contract laboratories.
- Coordinated research projects that investigated and quality-assured data collection procedures; integrated reported scientific data from numerous sources into databases for manipulation, geospatial relation, statistics, trend interpretation.
- Integrated geospatial data with collected scientific data across the U.S. to correlate spatial and temporal trends; extracted regional datasets for evaluating local systems.
- Conducted investigative field studies and analyzed interdisciplinary data to validate hypotheses of scientific systems, and presented the results in USGS, peer-reviewed publications, and at scientific symposiums.

Western Geophysical
January 1998 – March 2000
Geophysical Analyst

- Processed seismic data for subsurface characterization and resource development.
- Performed in-field seismic processing on North Slope of Alaska, supported field crews identifying data acquisition and surveying issues prior to crew relocation and aiding clients in determining future data acquisitions.
- Developed problem-solving strategies for different projects with heterogeneous datasets.

EDUCATION

Master of Science in Geochemistry, 1997

New Mexico Institute of Mining and Technology
Socorro, NM 87801

Bachelor of Science in Earth Science, 1995

University of California at Santa Cruz
Santa Cruz, CA 95064

Curriculum Vitae

Shelley Stall

Professional preparation

Shippensburg University	Shippensburg, PA	Mathematics and Computer Science	BA 1988
Ball State University	Muncie, IN	Production and Operations	MBA 1999

Appointments

2015 - Present	Sr. Director, Data Leadership, *American Geophysical Unio*n
2012 - 2015	Director, Defense and Federal Civilian Programs, *Amyx, Inc.*
2006 - 2012	Project Manager, Enterprise Data Strategy Analyst, System Software Engineer, *Amyx, Inc.*
2000 - 2006	Senior System Integrator & Project Engineer, Professional Services, *Emdeon Business Services (Division of WebMD)*
1992 - 2000	Manager, High-speed Optical Systems Development Group, *BMG Direct, Inc.*

Products – *Relevant*

Stall, S., et al. (2018). Advancing FAIR data in Earth, space, and environmental science. Eos, 99. https://doi.org/10.1029/2018EO109301. Published on 5 November 2018.

Stall, S., et al. (2018). Data sharing and citations: New author guidelines promoting open and FAIR data in the Earth, space, and environmental sciences, Sci. Editor, https://www.csescienceeditor.org/article/data-sharing-and-citations-new-author-guidelines-promoting-open-and-fair-data-in-the-earth-space-and-environmental-sciences/. Published on 1 November 2018.

Cutcher-Gershenfeld, J., Baker, K. S., Berente, N., Flint, C., Gershenfeld, G., Grant, B., et al. (2017). Five ways consortia can catalyse open science. Nature, 543(7647), 615–617. https://doi.org/10.1038/543615a. Published on 29 March 2017.

Stall, S., E. Robinson, L. Wyborn, L. R. Yarmey, M. A. Parsons, K. Lehnert, J. Cutcher-Gershenfeld, B. Nosek, and B. Hanson (2017), Enabling FAIR data across the Earth and space sciences, Eos, 98, https://doi.org/10.1029/2017EO088425. Published on 08 December 2017.

Stall, S. (2017), Enabling findable, accessible, interoperable, and reusable data, Eos, 98, https://doi.org/10.1029/2018EO081907. Published on 15 September 2017.

Stall S. (2018), Enabling FAIR Data in the Earth, Space, and Environmental Sciences, National Academies of Science, Data Matters: Ethics, Data, and International Research Collaboration in a Changing World Symposium, 15 March 2018.

Stall S. (2018), Enabling FAIR Data in the Earth, Space, and Environmental Sciences: New Journal Policy, Recommendations, and Guidelines, Council for Science Editors Annual Meeting, 11 May 2018.

Additional Products

Stall S. (2017), Developing Common Standards for Researchers, Repositories, and Publishers to Enable Open and FAIR Data in the Earth and Space Sciences, National Academies of Sciences, Engineering, and Medicine Board on Research Data and Information: Toward an Open Science Enterprise, 18 September 2017.

Stall S. (2018), Importance of Understanding and Documenting Legal Interoperability for FAIR Data, RDA & CODATA Legal Interoperability Of Research Data Interest Group Session, Research Data Alliance Plenary 11, 23 March 2018.

Stall, S., E. Robinson, L. Wyborn, L. R. Yarmey, M. A. Parsons, K. Lehnert, J. Cutcher-Gershenfeld, B. Nosek, and B. Hanson (2018), Enabling FAIR Data in the Earth and Space Sciences, 13th International Digital Curation Conference, 20 February 2018

Stall, S., E. Robinson, L. Wyborn, L. R. Yarmey, M. A. Parsons, K. Lehnert, J. Cutcher-Gershenfeld, B. Nosek, and B. Hanson (2018), Earth and Space Sciences Data Are a World Heritage: Community

Partnership to Develop Best Practices Across the Data Lifecycle to Advance Open and Fair Data, Ocean Sciences Meeting, 13 February 2018

Stall, S. (2018), Enabling FAIR and Open Data, Council for Data Facilities, ESIP Winter 2018, 11 January 2018

Synergistic activities

1. Enabling FAIR Data Project - As the project's Program Manager, Shelley is responsible for work deliverables, working group development and coordination, and strategic and managerial support. She conducts steering committee, and working group meetings bi-weekly. She chaired the two-day Stakeholder Meetings (85 attendees) held on 12-13 September 2018 and 16-17 November 2017, and the two face-to-face working sessions held 8 January 2018 in Bethesda MD (40 attendees) co-located with ESIP Winter Meeting, and 18 March 2018 in Potsdam Germany (50 attendees) co-located with RDA Plenary 11 in Berlin. This project is funded by the Laura and John Arnold Foundation.

2. Broadening Awareness of Data Management in the Earth and Space Sciences. As the Sr. Director of AGU's Data Programs, Shelley provides data management training at AGU's conferences and webinars. She manages the Data Fair in conjunction with Erin Robinson, the Executive Director of Earth Science Information Partners (ESIP) conducted across three days at the Fall Meeting and more recently at the Oceans Sciences Meeting February 2018.

3. Data Management Assessments – As an Enterprise Data Management Expert (EDME), Shelley is developing a new program to help data repositories large and small, domain specific or general, improve their data management practices and become better data stewards across the Earth and space sciences community. During 2015, two assessments were conducted: the USGS ScienceBase Data Repository and the Biological Chemical Oceanography Data Management Office (BCO-DMO). A third assessment was conducted in 2017 for AGU's data practices in preparation for their Digital Transformation Initiative currently underway.

4. Grant and Contract Management Experience. Shelley has managed large US federal government contracts and programs since 2004 in her position as Director of Amyx's Defense and Federal Civilian Programs to include contracts with the Department of State, Department of Defense, Department of Education, Department of Transportation, Veterans Affairs, and the Small Business Administration. She managed a staff of 25 who were regularly recognized for their excellence and customer satisfaction.

5. Professional Activities:

- Member of Earth Science Information Partners (ESIP), co-chair of the Software and Services Citation Working Group, participating in their Data Stewardship, Data Management Training, and Data Sustainability Workgroups.
- Member of the Research Data Alliance, co-chair of the ESIP/RDA Earth, Space, and Environmental Science Interest Group, participating in Data Policy Standardization and Implementation Working Group, RDA/WDS Scholarly Link Exchange (Scholix) Working Group, RDA/WDS Certification of Digital Repositories Working Group, WDS/RDA Assessment of Data Fitness for Use Working Group, and RDA/CODATA Legal Interoperability Interest Group.
- Member of FORCE11's Software Citation Implementation Group.
- Partner of the CMMI Institute and credentialed as an Enterprise Data Management Expert to educate, implement, and assess Data Management practices using their Data Management Maturity (DMM) Model.
- Member of International Data Management Association (DAMA) and certified as a Data Management Professional applying their Data Management Book of Knowledge.
- Member of the Project Management Institute (PMI) and certified as a Project Management Professional.

25 February 2019

Dear Committee Members:

On behalf of the American Geophysical Union (AGU), a community of Earth and space scientists that collaboratively advances and communicates science, I am pleased to support the proposal entitled "Building a Roadmap for Making Data FAIR in the U.S. Geological Survey" that is being submitted to the USGS Community for Data Integration for funding by co-Pis Fran Lightsom and Viv Hutchison.

The Co-PIs propose to conduct a workshop to determine a roadmap for making scientific data FAIR in the USGS. The importance of moving globally towards FAIR data cannot be understated. The broad scientific research community, granted the ability to seamlessly integrate USGS data into new Earth science research, can produce more timely new discoveries related to the grand challenges that affect our societies and our world.

The proposal identifies sound approaches for addressing key aspects of implementing FAIR principles in the USGS as a means to achieve maximum impact on researchers across many science domains.

I am very hopeful that this project will be supported as the need is pressing, the plan to accomplish the project goals is sound, the team is experienced and able, and upon completion the community impact will be valuable to broad AGU community.

Sincerely,

Brooks Hanson
Executive Vice President, Science
American Geophysical Union

February 26, 2019

Dear CDI Committee Members:

On behalf of DataONE, the foundation of new innovative environmental science through a distributed framework and sustainable cyberinfrastructure that meets the needs of science and society for open, persistent, robust and secure access to well-described and easily discovered Earth observational data, I am pleased to support the proposal entitled "Building a Roadmap for Making Data FAIR in the U.S. Geological Survey" that is being submitted to the USGS Community for Data Integration for funding by Co-PIs Fran Lightsom and Viv Hutchison.

The Co-PIs propose to conduct a workshop to determine a roadmap for making scientific data FAIR in the USGS. The importance of moving globally towards FAIR data cannot be understated. The broad scientific research community, granted the ability to seamlessly integrate USGS data into new Earth science research, can produce more timely new discoveries related to the grand challenges that affect our societies and our world.

The proposal identifies sound approaches for addressing key aspects of implementing FAIR principles in the USGS as a means to achieve maximum impact on researchers across many science domains.

I am very hopeful that this project will be supported as the need is keen, the plan is sound, the team is experienced and able, and upon completion the community impact will be deep and broad. The DataONE Federation looks forward to working with the team in this collaboration.

Sincerely,

William Michener
Professor and Director of e-Science, University Libraries, University of New Mexico
Principal Investigator, DataONE (Observation Network for Earth)

3980 BROADWAY SUITE 103-185 • BOULDER, CO 80304 • WWW.ESIPFED.ORG

February 25, 2019

Dear CDI Committee Members:

On behalf of the Earth Science Information Partners (ESIP), a cross-sector community that promotes interoperability across the collection, stewardship and use of Earth science data, information and knowledge. I am pleased to support the proposal entitled "Building a Roadmap for Making Data FAIR in the U.S. Geological Survey" that is being submitted to the USGS Community for Data Integration for funding by co-Pis Fran Lightsom and Viv Hutchison.

The Co-PIs propose to conduct a workshop to determine a roadmap for making scientific data FAIR in the USGS. The importance of moving globally towards FAIR data cannot be understated. The broad scientific research community, granted the ability to seamlessly integrate USGS data into new Earth science research, can produce more timely new discoveries related to the grand challenges that affect our societies and our world.

The proposal identifies sound approaches for addressing key aspects of implementing FAIR principles in the USGS as a means to achieve maximum impact on researchers across many science domains.

I am very hopeful that this project will be supported as the need is keen, the plan is sound, the team is experienced and able, and upon completion the community impact will be deep and broad.

Sincerely,

Erin Robinson

Erin Robinson
Executive Director
ESIP - Earth Science Information Partners
esipfed.org | 314.369.9954

EarthCube

Data, Workflow Support, and Cyberinfrastructure for Geoscience

28 Feb, 2019

Dear Committee Members:

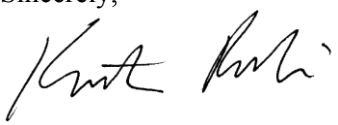
On behalf of EarthCube, a National Science Foundation initiative dedicated to fostering a community-governed, common cyberinfrastructure for geoscientists to collect, access, analyze, share, visualize and archive all forms of data and resources, I am pleased to support the proposal entitled "Building a Roadmap for Making Data FAIR in the U.S. Geological Survey" that is being submitted to the USGS Community for Data Integration for funding by co-Pis Fran Lightsom and Viv Hutchison.

The Co-PIs propose to conduct a workshop to determine a roadmap for making scientific data FAIR in the USGS. The importance of moving globally towards FAIR data cannot be understated. The broad scientific research community, granted the ability to seamlessly integrate USGS data into new Earth science research, can produce more timely new discoveries related to the grand challenges that affect our societies and our world. EarthCube is likewise ramping up an effort to promote FAIR practices in geoscience workflows, with a similar vision for positive impacts on its researcher community

The proposal identifies sound approaches for addressing key aspects of implementing FAIR principles in the USGS as a means to achieve maximum impact on researchers across many science domains.

I am very hopeful that this project will be supported as the need is keen, the plan is sound, the team is experienced and able, and upon completion the community impact will be deep and broad.

Sincerely,



Dr. Ken Rubin,
Chair of the EarthCube Leadership Council, and
Professor of Volcanology and Geochemistry, University of Hawaii at Manoa.

GEOLOGICAL SURVEY OF ALABAMA

Berry H. (Nick) Tew, Jr.
State Geologist

420 Hackberry Lane
P.O. Box 869999
Tuscaloosa, Alabama 35486-6999
Phone (205)349-2852
Fax (205)349-2861
www.gsa.state.al.us

February 25, 2019

Committee Members:

As Director of the Energy Investigations Program of the Geological Survey of Alabama, I am pleased to support the proposal entitled “Building a Roadmap for Making Data FAIR in the U.S. Geological Survey” that is being submitted to the USGS Community for Data Integration for funding by Co-Principal Investigators Fran Lightsom and Viv Hutchison.

The Co-Principal Investigators propose to conduct a workshop to determine a roadmap for making scientific data FAIR in the USGS. The importance of moving globally towards FAIR data cannot be understated. The broad scientific research community, granted the ability to seamlessly integrate USGS data into new Earth science research, can produce more timely discoveries related to the grand challenges that affect our societies and our world.

The proposal identifies sound approaches for addressing key aspects of implementing FAIR principles in the USGS as a means to achieve maximum impact on researchers across many science domains.

I am very hopeful that this project will be supported as the need is keen, the plan is sound, the team is experienced and able, and upon completion the community impact will be deep and broad.

Sincerely,

Denise J. Hills
Director, Energy Investigations
Geological Survey of Alabama

Community for Data Integration (CDI)
Data Management Plan for Full Proposals

Instructions: Fill out all relevant fields of the following tables to help your team plan for your project's data management and product communication needs. For more guidance on data management plans, see the *USGS Data Management Website*, specifically the *Data Management checklist*. All products resulting from CDI projects must comply with the *Office of Science Quality and Integrity Instructional Memoranda* on data management.

Data Inputs	
Title	**Source/URL**
FORCE11, The FAIR Data Principles, 03/01/19	https://www.force11.org/group/fairgroup/fairprinciples
European Union report entitled "Turning FAIR into Reality", November 2018	https://ec.europa.eu/info/sites/info/files/turning_fair_into_reality_1.pdf
COPDESS, Enabling Fair Data Project, 03/01/19	http://www.copdess.org/enabling-fair-data-project/
The FAIR Guiding Principles for scientific data management and stewardship Mark D. Wilkinson, Et. Al. Sci Data. 2016; 3: 160018. Published online 2016 Mar 15.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4792175/
Horizon2020 Online Manual, 03/01/19	http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-dissemination_en.htm
GOFAIR, Fair Principles 03/01/19	https://www.go-fair.org/fair-principles/
A design framework and exemplar metrics for FAIRness Mark D. Wilkinson, Et. Al. Sci Data. 2018; 5: 180118. Published online 2018 Jun 26.	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6018520/

Data Processing	
Access and Sharing	Metrics for identifying gaps to improve adherence of USGS data management/delivery practices with FAIR guidelines will be established and then measured through a workshop and an anonymous questionnaire. The results of both will be summarized and presented as a publication.

Proposed Products (repeat table for multiple products)	
Title	FAIR Workshop Proceedings

Product Type	Publication
Description	Summary of Workshop outcomes and FAIR assessment
Format	.pdf
Data Volume Estimate	~5MB
Backup & Storage	Drafting of the publication will occur in BisonConnect Google Drive.
Metadata	*N/A*
Repository for Product	USGS Pubs Warehouse
Communication Plan	There are several internal working groups and communities that would benefit by presentation of the FAIR road map and GAP analysis. We will present at a CDI Funded Project Report Monthly session and subsequently the CDI Data Management Working Group. We will also present to the ScienceBase Data Managers community and Mission Area special seminars such as the Water Mission Area seminar and Core Science Systems Brown Bag. There are also opportunities to target external audiences. The Principal Investigators and several collaborators also regularly attend ESIP meetings, AGU, and DOI working groups on Data Resource Management. Alternative formats for communication include a Need To Know blog post and the webpage (listed below) that will also serve as a communication outlet to a broad audience.

Proposed Products (repeat table for multiple products)	
Title	FAIR Webpage
Product Type	Web Link
Description	Online resource to distribute USGS FAIR resources, such as a FAIR roadmap and training presentations. The resource will be added to an existing website such as the USGS Data Management website.
Format	WRET Drupal
Data Volume Estimate	~10MB
Backup & Storage	WRET Web Hosting Platform and Google Docs for drafting content
Metadata	*N/A*
Repository for Product	WRET Web Hosting Platform (Data Management Website)
Communication Plan	The webpage itself will serve as a communication outlet to a broad audience and the link will be included in presentations referenced above.

Community For Data Integration (CDI) RFP BUDGET FORM

Budget Category	Federal Funding "Requested"	Matching Funds "Proposed"
GRAND TOTAL:	$49,724	$94,820
Do not edit the rows above this line.		
1. PERSONNEL (SALARIES including benefits):		
Personnel:		
Lightsom, 160 hrs at $82/hr	$	$13,120
Hutchison, 160 hrs at $78.56/hr	$	$12,570
Ladino, 160 hrs at $60/hr	$	$9,609
Latysh, 160 hrs at $82/hr	$	$13,120
Debrewer, 160 hrs at $82/hr	$	$13,120
Bishop, 160 hrs at $87/hr	$	$13,925
Stall, 160 hrs at $121/hr	$	$19,357
Contract Personnel : None		
Total Salaries:	$0	$94,820
2. TRAVEL EXPENSES:		
Trip 1 (CDI Annual Workshop, 5 days, 2 travelers)		
Per Diem:	$2,316	$
Transportation (Airfare + Mileage/Shuttle):	$1,500	$
Other expenses (e.g. registration fees):	$100	$
Trip 2 (FAIR Roadmap Workshop, 5 days, 19 travelers)		
Per Diem:	$25,137	$
Transportation (Airfare + Mileage/Shuttle):	$11,628	$
Other expenses (e.g. registration fees):	$1,235	$
Total Travel Expenses:	$41,916	$0
3. OTHER DIRECT COSTS: (itemize)		
Equipment (inc. software, hardware,	$	$
Publication Costs:	$	$
Office supplies:	$	$
Training:	$	$
Other expenses (specify):	$	$
Total Other Direct Costs:	$0	$0
Total Direct Costs:	$41,916	$94,820
Indirect Cost: WHCMSC 18.628%	$7,808	$